

CLAIMS

We claim:

1. A method for creating a digital model of an object, the method comprising:
 - receiving one or more behavioral parameters associated with each design feature of the object from a user;
 - determining a correspondence between each design feature and one or more body partitions within a predefined set of body partitions composing a body of the object using the behavioral parameters;
 - assigning a contributing volume to each of the one or more body partitions;
 - and
 - computing the digital model of the object using contributing volumes of each design feature of the object.
2. The method of claim 1 wherein each of the predefined set of body partitions is a node of a Boolean tree.
3. The method of claim 1 further comprising:
 - computing the contributing volume based on a profile of a corresponding design feature.

4. The method of claim 1 further comprising:
creating a link between a body partition having a contributing volume and a corresponding design feature of the object.

5. The method of claim 4 wherein the design feature is characterized by one or more geometrical parameters and one or more behavioral parameters.

6. The method of claim 4 further comprising:
creating links between related design features of the object.

7. The method of claim 1 wherein the digital model is computed using a predefined algorithm.

8. The method of claim 7 wherein the predefined algorithm remains unchanged for any product.

9. The method of claim 1 further comprising:
storing data pertaining to the digital model in a database.

10. The method of claim 10 wherein the data pertaining to the digital model includes the predefined set of body partitions with corresponding contributing volumes and links to corresponding design features of the object.

11. The method of claim 9 further comprising:
re-computing the digital model of the object using the data stored in a
database upon receiving a user request.

12. The method of claim 1 further comprising:
receiving a user request to modify the object;
reassign contributing volumes to body partitions according to the requested
modification; and
re-computing the digital model of the object using the reassigned contributing
volumes.

13. The method of claim 12 wherein the requested modification requires a
change of one or more parameters of an existing design feature of the object.

14. The method of claim 12 wherein the requested modification requires
an addition of a new design feature to the object.

15. An apparatus for creating a digital model of an object, the apparatus
comprising:

a user input processor to receive one or more behavioral parameters
associated with each design feature of the object from a user, and to determine a

correspondence between each design feature and one or more body partitions within a predefined set of body partitions composing a body of the object using the behavioral parameters;

a volume distributor to assign a contributing volume to each of the one or more body partitions; and

a model generator to compute the digital model of the object using contributing volumes of each design feature of the object.

16. The apparatus of claim 15 wherein each of the predefined set of body partitions is a node of a Boolean tree.

17. The apparatus of claim 15 wherein the volume distributor is further to compute the contributing volume based on a profile of a corresponding design feature.

18. The apparatus of claim 15 wherein the volume distributor is further to create a link between a body partition having a contributing volume and a corresponding design feature of the object.

19. The apparatus of claim 18 wherein the design feature is characterized by one or more geometrical parameters and one or more behavioral parameters.

20. The apparatus of claim 18 wherein the volume distributor is further to create links between related design features of the object.

21. The apparatus of claim 15 wherein the digital model is computed using a predefined algorithm.

22. The apparatus of claim 21 wherein the predefined algorithm remains unchanged for any object.

23. The apparatus of claim 15 further comprising a database to store data pertaining to the digital model.

24. The apparatus of claim 23 wherein the data pertaining to the digital model includes the predefined set of body partitions with corresponding contributing volumes and links to corresponding design features of the object.

25. The apparatus of claim 23 wherein the model generator is further to recompute the digital model of the object using the data stored in a database upon receiving a user request.

26. The apparatus of claim 1 wherein:

the volume distributor is to reassign contributing volumes to body partitions in response to a user request to modify the object; and

the model generator is to re-compute the digital model of the object using the reassigned contributing volumes.

27. The apparatus of claim 26 wherein the requested modification requires a change of one or more parameters of an existing design feature of the object.

28. The apparatus of claim 26 wherein the requested modification requires an addition of a new design feature to the object.

29. A system for creating a digital model of an object, the system comprising:

means for receiving one or more behavioral parameters associated with each design feature of the object from a user;

means for determining a correspondence between each design feature and one or more body partitions within a predefined set of body partitions composing a body of the object using the behavioral parameters;

means for assigning a contributing volume to each of the one or more body partitions; and

means for computing the digital model of the object using contributing volumes of each design feature of the object.

30. A computer readable medium comprising executable instructions which when executed on a processing system cause said processing system to perform a method comprising:

- receiving one or more behavioral parameters associated with each design feature of the object from a user;
- determining a correspondence between each design feature and one or more body partitions within a predefined set of body partitions composing a body of the object using the behavioral parameters;
- assigning a contributing volume to each of the one or more body partitions;
- and
- computing the digital model of the object using contributing volumes of each design feature of the object.